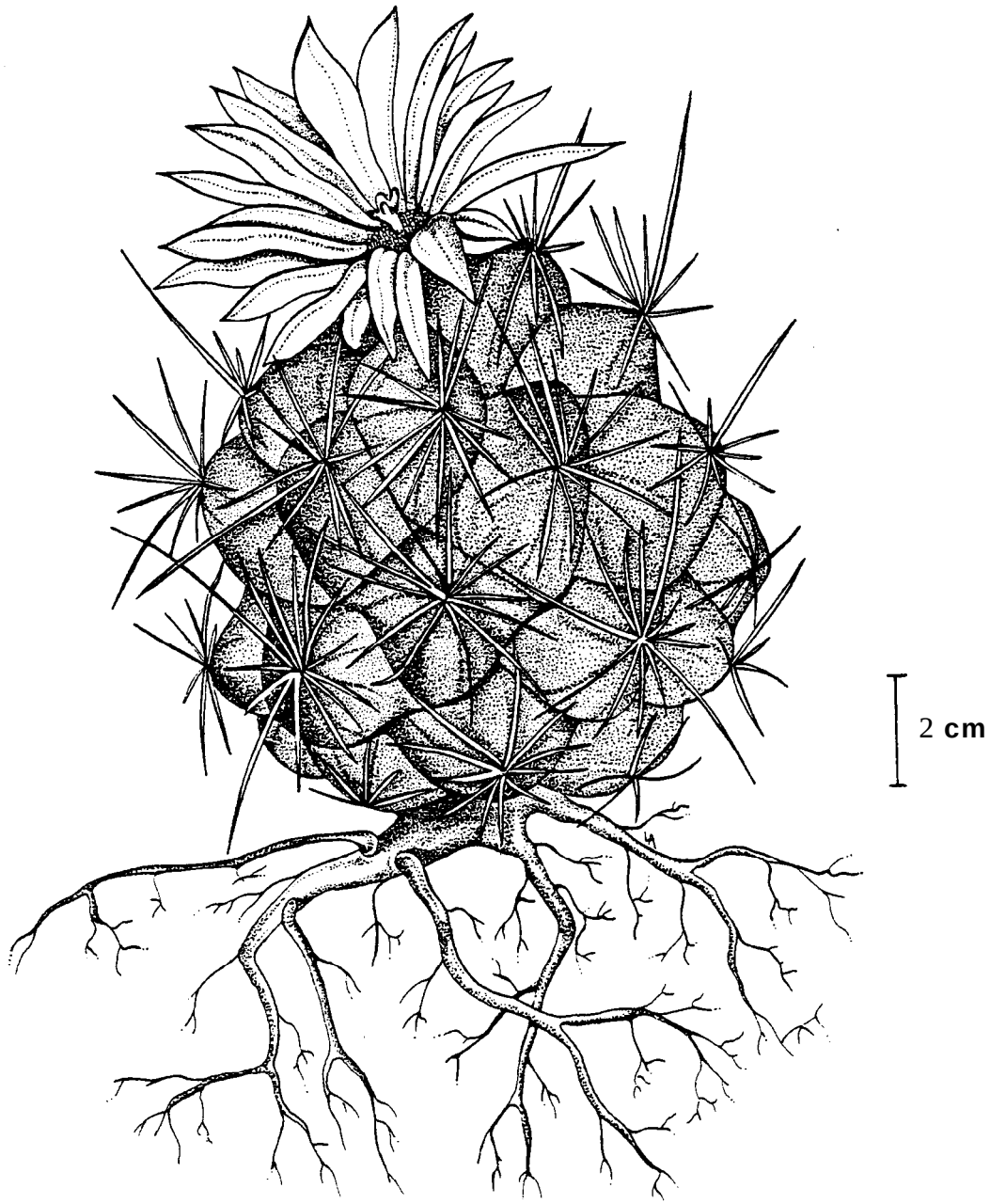
BUNCHED CORY CACTUS

(*Coryphantha ramillosa*)

RECOVERY PLAN



U.S. Fish and Wildlife Service
Albuquerque, New Mexico

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DISCLAIMER

This is the completed Bunched Cory Cactus Recovery Plan. It has been approved by the U.S. Fish and Wildlife Service. It does not necessarily represent official positions or approvals of cooperating agencies and does not necessarily represent the views of all individuals who played a role in preparing this plan. This plan is subject to modification as dictated by new findings, changes in species status, and completion of tasks described in the plan. Goals and objectives will be attained and funds expended contingent upon appropriations, priorities, and other constraints.

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SUMMARY

Goal : To remove the bunched cory cactus from the Federal list of endangered and threatened species by managing the species in a way that will ensure the continued existence of natural self-sustaining populations.

Recovery Criteria: The criteria for delisting the bunched cory cactus willbetoidentify atleastthree sites where the species can be protected and then carry out protective management measures. One site should be on private land in northeastern Brewster or southwestern Tyrrell County, one site should be in Big Bend National Park, and one site should be in Mexico. Each site should initially contain at least 500 plants and should have enough available habitat to permit population expansion and growth. The species can be delisted when monitoring and habitat surveys indicate that a total of a least 10,000 plants is being sustained at the protected and managed sites.

Actions Needed: The major steps needed to meet the recovery criteria include: protecting populations on Federal and State lands through law enforcement and protective management, protecting populations on private land through landowner cooperation and protective management, protecting populations in Mexico through cooperation with the Mexican goverment or Mexican conservation groups, monitoring populations to determine population and habitat changes, gathering biological information that can be used in management, searching for new populations, and developing public support for preservation of the bunched cory cactus.

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PART I

INTRODUCTION

Brief Overview

The bunched cory cactus, Coryphantha ramillosa Cutak, was designated a threatened species under the Endangered Species Act on November 6, 1979 (USFWS, 1979). It is also listed as threatened by the State of Texas. This species is known from southern and southeastern Brewster County and southwestern Terrell County in the Big Bend Region of Texas, and from the adjacent State of Coahuila in Mexico. Three other members of this genus are recognized as threatened or endangered: C. minima and C. sneedii var. sneedii are listed as endangered and C. sneedii var. leei is listed as threatened. Seven other species from this genus are under review for possible threatened or endangered designation (USFWS, 1985).

The bunched cory cactus has a limited range and has never been known to be abundant. Grazing and collecting are the greatest threats to this species.

The objective of this plan is to outline steps to recover the bunched cory cactus by removing threats to the species and its habitat. This should make it possible to achieve and

document long-term population stability. Attainment of these goals will lead to the ultimate objective of removal of the bunched cory cactus from the Federal list of endangered and threatened species.

This plan begins with background information on the bunched cory cactus that includes taxonomy, morphology, distribution, habitat, population biology and phenology, associated species, land ownership, threats, and conservation efforts. This information is followed by a step-down outline and narrative that provide information on recovery measures. The final section of this plan contains an implementation schedule that lists the recovery measures, priorities for their accomplishment, agencies involved, and estimated costs.

Taxonomy

Coryphantha ramillosa was discovered in 1936 by A.R. Davis and was described by Ladislaus Cutak in 1942. The holotype (A.R. Davis s.n.) is housed at the Missouri Botanical Garden (MO #1242260). In Cacti of the Southwest, Del Weniger (1970) recognized this species under the new combination Mammillaria ramillosa, but this name is invalid because Weniger did not follow the rules of botanical nomenclature in the publication of this nomenclatural combination.

Morphology

The stems of Coryphantha ramillosa are dark grayish green, solitary or rarely with a few branches, 6-9 cm (2.4-3.6 in.> long, and 6-9.5 cm (2.4-3.7 in.) in diameter. There are 3-6 central spines per areole: 1 inner, and 2-5 but usually 3 outer. The inner central spine is 25-40 mm (1-1.6 in.) long, and the outer central spines, 17-38.5 m m (.7-1.5 in.) long. The dull white to pale gray radial spines are 12-30 mm (.5-1.2 in.) long. The flowers are 38-65 mm (1.5-2.6 in.) long and 30-50 mm (1.2-2 in.) in diameter. The fruits are l-2.5 cm (.4-1 in.) long. The seeds are finely raised-reticulate, reniform, reddish-brown, and. 1.4-1.5 m m (.06 in.) long.

Distribution

The bunched cory cactus is known only from Brewster and Terre11 Counties, Texas and central Coahuila, Mexico (Fig. 1). It is found primarily as widely scattered populations or individuals occurring in canyons along the Rio Grande River from Mariscal Canyon in Brewster County, downriver to Sanderson Canyon in Terre11 County (USFWS, 1986). The species occurs mostly on private land but there is one known population in Big Bend National Park (Hell et al., 1985) and a locality reported for

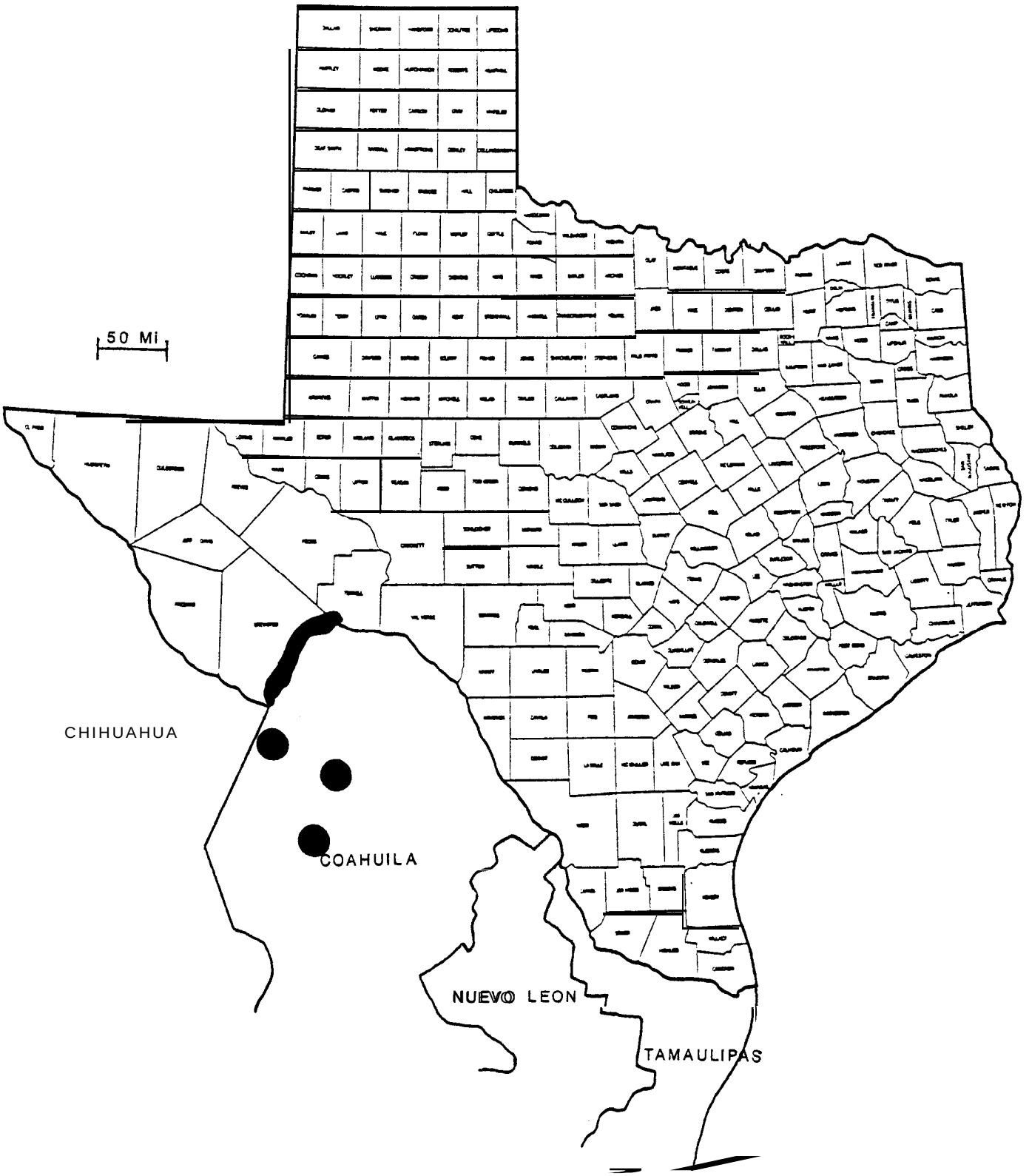

Figure 1. General location of Corynhantha ramillosa.

Maravillas Canyon (Weniger, 1979) in the Black Gap Wildlife Management Area owned by the State of Texas.

Presumably the present and historic ranges of the bunched cory cactus are similar. Although it was first discovered nearly 50 years ago, there is very little information about the plant and its habitat. It occurs mostly in an inaccessible and infrequently studied area.

Habitat

The bunched cory cactus grows in the Chihuahuan Desert Scrubland (Brown and Lowe, 1980). In the northern part of its range, the species is mostly confined to rocky, well-drained, and full sunlit sites on steep canyon sides and hill summits along the canyons of the Rio Grande. However, one U.S. population is known from hills well-removed from the Rio Grande. In north-central Coahuila, Mexico, the cactus occurs along hill slopes and summits. The elevation range for bunched cory cactus is between 750 and 1,050 meters (2,500-3,500 ft). The mean annual precipitation is about 30 cm (12 in.) and the mean annual temperature is about 64 to 66 degrees F (USFWS, 1986).

Population Biology and Phenology

Accurate counts for the bunched cory cactus have not been made, but it is speculatedthatthetotalnumber of plants over the species' entire range is approximately 5,000-10,000. The population in Big Bend National Park covers approximately 25 m x 1 km (82 feet x .6 mile) and numbers approximately 800-900 plants (M. Fleming, Big Bend National Park, pers. comm., 1986).

In the National Park population the number of plants per unitareavaries widely. One 10 meter square area may contain 5 individuals while a similar area nearby will not support a single plant. The plants have a very uneven distribution, mostly growing on the tops of small hills or on the rocky flats below the hills. Seedlings were observed throughout the population (Hell, et al., 1985).

The bunched cory cactus begins blooming at an age of 5 years. Buds form from June to July (Hell, et al., 1985). Reports of flowering time vary: Weniger (1979) states April to May, Warnock (1970) states June, and Heil et al. (1985) state July to August. Flowers open in mid-afternoon during the warmest part of the day and last 3-4 days. The major pollinator is thought to be a green sweat bee in the family Halictidae. Fruits form from October through December (Heil et al., 1985). In its natural habitat and in cultivation virtually 100 percent of the flowers produce

fruits. However, such high fruit set is only likely when plant densities are such that cross pollination is assured (A. Zimmerman, Chihuahuan Desert Research Institute, pers. comm., 1986). The fruits ripen in December and the seeds are distributed by rodents and ants. There are about 75 seeds per fruit. The best place for seedling survival is under rocks or deep in the cracks of rocks where the seeds are protected from dessication and predation.

Associated Species

Vegetation associated with the bunched cory cactus consists of low shrubs, some rosette-forming perennials, many other cacti, and both annual and perennial herbs. Some of the species are: Acacia constricta, Bouteloua breviseta, Agave lecheguilla, Larrea tridentata, Leucophyllum candidum, Euphorbia antisyphilitica, Jatropha dioica, Selaginella sp., Krameria glandulosa, Fouquieria splendens; associated cacti include: Opuntia leptocaulis, O. imbricata, O. phaeacantha var. discata, Echinocereus stramineus, E. pectinatus, Ferocactus hamatacanthus, Echinocactus horizonthalonius, Echinomastus warnockii, Coryphantha echinus, C. duncanii, Ariocarpus fissuratus, and Mammillaria lasiacantha. (Hell et al., 1985).

Land Ownership

The bunched cory cactus is found on Federal land administered by the National Park Service, Texas State land administered by the Texas Parks and Wildlife Department, and private land owned mostly by ranchers. Probably 90 percent of all plants occur on private land either in the United States or Mexico.

Impacts and Threats

When listed in 1979, over-collecting was believed the primary threat to Coryphantha ramillosa, with the effect being intensified by the species' low population numbers and limited range. Collecting from private lands remains a threat because roads in the region often lack gates and easy access is also available to some sites by boat from the Rio Grande River. Collecting is illegal in Big Bend National Park and the Black Gap Wildlife Management Area, but the large size of these areas makes enforcement difficult. No monitoring data are yet available to determine collecting impacts on populations of the bunched cory cactus, but a study has been initiated in Big Bend National Park by a group from Earlham College, Richmond, Indiana (M. Fleming, pers.comm., 1986). Monitoring will help determine the degree of collecting as well as population changes owing to natural cycles.

Habitat damage from off-road vehicles may be a minor threat but the only use of off-road vehicles is by private landowners or by those who can gain access. Even then, this cactus grows in a very rocky habitat that is generally not favored for off-road vehicle use.

Grazing is a threat mainly through the effects of livestock trampling. The ranch land around Reagan Canyon appears to have been heavily grazed. It is not known how much livestock is being grazed on other ranches where the bunched cory cactus grows. Grazing is no longer allowed in Big Bend National Park.

Management

Collecting and Trade

On July 29, 1983, Coryphantha ramillosa was placed on Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), which requires permits from both the importing and exporting countries before shipment of field-collected plants may occur. Only scientific trade benefiting the species' survival is allowed.

The Endangered Species Act of 1973, as amended in 1982, prohibits the removal (from Federal lands) and reduction to possession of plants listed under the provisions of the Act. It

also prohibits interstate or foreign commerce in any listed plant species. Under certain circumstances permits can be obtained to carry out otherwise prohibited activities.

The Lacey Act, as amended in 1981, also provides some protection for the bunched cory cactus. Under this Act, it is prohibited to import, export, sell, receive, acquire, purchase, or engage in the interstate or foreign commerce of any plant taken, possessed, or sold in violation of any law, treaty, or regulation of the United States, any Indian Tribal Law, or any law or regulation of any State.

Coryphantha ramillosa is on the Texas State protected plant list. Under Texas law, a scientific collecting permit is required for plant collection on State land; permits are only issued for scientific or educational activities that will not harm populations. Collection from private land for commercial purposes requires written permission from the landowner and a State commercial collecting permit. Texas law requires that each endangered or threatened plant in commerce be tagged and that the tag remain attached until the plant reaches its ultimate destination.

Federal Activities

Section 7 of the Endangered Species Act requires all Federal agencies to consult with the Fish and Wildlife Service if any activities they authorize, permit, or fund might affect a threatened or endangered species. If the activities are found to jeopardize the continued existence of a species, the activities cannot proceed unless modifications are made that will remove the jeopardy situation. This provision of the Endangered Species Act most often applies to activities on lands under Federal management, but it also applies to activities on private lands if Federal agencies are involved.

Off-Road Vehicles

Within Big Bend National Park, all vehicles must stay on existing roads, and violators are subject to fine. Most of the private land where bunched cory cactus grows is posted. There appears to be little ORV use on these private lands.

Grazing

Grazing on private ranch lands appears to be moderate to heavy. In the Reagan Canyon region much of the land is over-grazed. Bunched cory cactus occurs in a rocky open habitat and

is susceptible to trampling by livestock. Livestock grazing is not pemitted on Big Bend National Park.

Research

Monitoring

A monitoring study has been initiated on Big Bend National Park by a group from Earlham College, Richmond, Indiana. They have mapped the location of every bunched cory cactus in the Park's only population and plan to return annually to determine changes. If this is continued for several years, it should provide valuable information about both collecting and natural changes. The population in the Park is well known and fairly easy to reach; as such, it is a likely target for illegal collecting.

Propagation

Mesa Garden of Belen, New Mexico maintains parent plants for the commercial sale of seeds of bunched cory cactus. The Center for Plant Conservation through its participating botanical gardens is developing cultivated stocks of many endangered species. The Desert Botanical Garden of Phoenix, Arizona is the participating institution responsible for western Texas. They will, as funding

and priorities permit, be adding bunched cory cactus to their portion of the Center's national living collection.

Other Research

Dr. Allan Zimmerman of the Chihuahuan Desert Research Institute has been studying Coryphantha for many years and has contributed much to our knowledge of the genus. A National Park Service contracted study of sensitive and rare cacti in Big Bend National Park (Hell et al., 1985) failed to find any new populations of bunched cory cactus.

PART II

RECOVERY

Primary Objective

The primary objective of this plan is to remove threats to the bunched cory cactus so that healthy natural populations can be sustained. The most important actions for meeting this objective are:

1. Develop and implement management measures that will ensure the continued protection of at least three sites where populations occur. The three sites should represent the full geographic range of the species, which means one site should be on private land in northeastern Brewster or southwestern Tyrrell County, one site should be in Big Bend National Park, and one site should be in Mexico. Each site should initially contain at least 500 plants, and should have adequate suitable habitat to allow for population expansion and growth.

2. Develop and implement cooperative law enforcement strategies to provide protection against illegal collecting both on public and on private lands.

3. Search potential habitat and accurately determine population locations, area occupied, and number of plants.

4. Establish permanent monitoring plots to determine population changes. The plots should be censused at least annually.

Actions necessary for delisting include:

1. Identifying at least three sites (using the criteria on the previous page) where the species will be protected.

2. Carrying out management measures that are determined to be necessary for continued protection of the three sites and for protection of the species.and its habitat in general.

3. Demonstrating long-term stability or increase in population levels and habitat through monitoring and habitat surveys. A total of 10,000 plants at protected and managed sites must be sustained.

These criteria will be evaluated for adequacy upon attainment and prior to delisting.

Step-Down Outline

1. Remove threats to the bunched cory cactus by enforcement of existing regulations and management for protection.
   - 11. Protect populations on Federal and State lands.
     - 111. Enforce existing Federal and State laws.
     - 112. Conduct consultations under Section 7 of the Endangered Species Act.
     - 113. Develop and implement management measures.
     - 114. Identify areas for protection.
     - 115. Seek cooperation of the National Park Service and the State of Texas.
     - 116. Monitor the populations and habitat.
   - 12. Protect populations on private lands.
     - 121. Enforce existing trade laws.
     - 122. Conduct consultations under Section 7 of the Endangered Species Act.
     - 123. Develop cooperation with private landowners.
     - 124. Prepare and implement management plans.
     - 125. Monitor populations and habitat.
   - 13. Protect populations in Mexico.

2. Gather information for use in management.
   - 21. Search for new populations.

22. Study the population biology and ecology of the bunched cory cactus.
    221. Study soil needs.
    222. Study water needs.
    223. Determine the role of animals in seed dispersal.
    224. Determine what microhabitat factors are involved in seedling establishment.
    225. Determine pollinators.
    226. Monitor population numbers to determine which trends result from natural cycles and which result from human impacts.
23. Apply the results of studies done under task 22.
    231. Determine environmental parameters defining and restricting the species' habitat.
    232. Update management measures.

3. Develop a comprehensive trade management plan for all cacti.

4. Refine propagation techniques to provide nursery stocks and seeds to reduce collecting pressure.
    41. Investigate various methods of propagation.
    42. Publish propagation techniques in cactus journals.

5. Establish populations at the botanical gardens of research institutions.

6. Develop public awareness, appreciation, and support for preservation of the bunched cory cactus.

61. Use pamphlets, talks, and slide shows to increase the public's knowledge of the bunched cory cactus.

62. Enlist the support of public interest groups for protection and preservation of the bunched cory cactus.

Narrative

1. Remove threats to the bunched cory cactus by enforcement of existing regulations and mangement for protection.

Because of the rarity of the bunched cory cactus the populations must be protected by the enforcement of existing Federal, and State regulations and by management to remove threats to the species.

11.. Protect populations on Federal and State lands.

Federal and State agencies will need to develop management programs to ensure the continued existence of the species on their lands.

111. Enforce existing Federal and State laws.

Regulations under the ESA, CITES, Lacey Act, or State native plants laws should be enforced to the maximum extent possible.

112. Conduct required consultations under Section 7 of the Endangered Species Act.

The National Park Service must conduct biological assessments and then formally consult with the Fish and Wildlife Service on any Big Bend National Park project that may affect the bunched cory cactus. Other Federal agencies must consult with the Fish and Wildlife Service if it is determined that actions authorized, permitted, or funded by Federal agencies on state lands may affect the bunched cory cactus.

113. Develop and implement management measures.

Specific management measures should be included in appropriate agency planning documents. The planning documents should contain procedures for preventing loss of plants and habitat due to such actions as trail building, road building or improvement, or habitat improvement for other species. The plans should indicate measures for protecting populations from collecting and other visitor activities. Implementation of management measures is a required step for delisting the bunched cory cactus.

114. Identify areas for protection.

The National Park Service and the Texas Parks and Wildlife Department should identify portions of Big Bend National Park and Black Gap Wildlife Management Area where bunched cory cactus will be protected. Protected areas do not need to be restricted to use solely as endangered species "sanctuaries", but activities that could jeopardize populations must be avoided.

115. Seek cooperation of the National Park Service and the State of Texas.

In order to facilitate the management and protection of the bunched cory cactus, it may be desirable for U.S. Fish and Wildlife Service to develop memoranda of understanding or cooperative agreements with the National Park Service or the Texas Parks and Wildlife Department. These agreements should outline long-term objectives and the general management activities that will be carried out by each agency.

116. Monitor the populations and habitat.

Monitoring plots should be established in Big Bend National Park and Black Gap Wildlife Management Area and these plots should be inventoried

at least annually. Monitoring is needed to determine long-term population and habitat stability and is a requirement for delisting.

12. Protect populations on private lands.

Perhaps 90 percent of all bunched cory cacti are found on private lands in the United States and Mexico. An attempt should be made to protect at least some of the United States plants.

121. Enforce existing trade laws.

Federal and State laws do not specifically prohibit collecting on private lands, however, the laws do regulate commercial trade and these provisions can still be enforced. Under Texas law, a permit is required for commercial collecting on private land.

122. Conduct required consultations under Section 7 of the Endangered Species Act.

Federal agencies that authorize, permit, or fund actions on private lands must formally consult with the Fish and Wildlife Service if it is found that the actions may affect the bunched cory cactus.

123. Develop cooperation with private landowners.

In order to maintain the species on private lands it will be necessary to obtain the cooperation and goodwill of private landowners. Written agreements should be developed with landowners that describe specific measures that can be accomplished through landowner and Fish and Wildlife Service cooperation.

124. Prepare and implement management plans.

Once cooperation with private landowners has been established, the Fish and Wildlife Service should develop management plans for populations on private lands. Implementation of management plans is an essential step in delisting.the bunched cory cactus.

125. Monitor populations and habitat.

Monitoring plots should be established on private land and these plots should be inventoried at least annually. Monitoring is needed to determine long-term population and habitat stability and is a requirement for delisting.

13. Protect populations in Mexico.

Cooperation should be sought with the Mexican government or with private Mexican conservation groups to protect and manage populations in Coahuila.

2. Gather information for use in management.

A thorough understanding of the population biology and ecology of the bunched cory cactus is needed to help manage healthy natural populations.

21. Search for new populations.

Inventories are needed to map the exact range of the bunched bunched cory cactus. Geologic formations similar to those known to support the cactus should be checked to see if populations have been overlooked. Most of the potential habitat for the bunched cory cactus is in Coahuila, Mexico, or on private lands. Local involvement will be needed to gain access to private ranches. These inventories should be accomplished prior to establishing protected sites on private land.

22. Study the population biology and ecology of the bunched cory cactus.

Generalized studies will provide information about the habitat of the bunched cory cactus. Growth requirements and limiting factors should be studied in detail.

221. Study soil needs.

Soil factors such as chemical composition, texture, structure, aeration, temperature, and relation to parent material need to be assessed.

222. Study water needs.

The hydrologic characteristics of the soil on which the bunched cory cactus occurs need to be determined. The timing, amount, and duration of rains needs to be studied. The importance of rainfall run-off in seed dispersal should also be studied.

223. Determine the role of animals in seed dispersal.

Study is needed to determine what role, if any, insects and/or rodents play in seed dispersal of the bunched cory cactus.

224. Determine what microhabitat factors are involved in seedling establishment.

Most bunched cory cactus seeds germinate in cracks of limestone or under rocks where the seeds are well protected. A thorough study of the edaphic factors in relation to seedling ecology is needed.

225. Determine pollinators.

The major pollinator of the bunched cory cactus is thought to be a green sweat bee in the family Halictidae. Although no other pollinators have been observed, investigations should be conducted to determine if other insects or other organisms are involved in the pollination of this cactus.

226. Monitor population numbers to determine which trends result from natural cycles and which result from human impacts.

Natural population numbers are often cyclic. Overlying this natural variation there may be effects from human environmental perturbations. Long-term monitoring is needed to determine the causes of overall population trends.

23. Apply the results of studies done under task 22.

Studies of population biology and ecology can provide information essential to understanding the species' distribution and to successful management.

231. Determine environmental parameters defining and restricting the species' habitat.

Information is needed to explain why the bunched cory cactus does not occur on all of the apparently

suitable habitat in the area. Once these parameters are understood, the potential habitat for the species can be identified.

232. Update management measures.

As more data are obtained on the population biology and ecology of the bunched cory cactus, management measures should be revised to incorporate this new information.

3. Develop a comprehensive trade management plan for all cacti.

Studies are needed to determine which species are in trade, the overall trend of trade in listed cacti, and the feasibility of reducing collecting pressure on wild populations by promoting a commercial artificial propagation program. Strategies for effective law enforcement under ESA, CITES, Lacey Act, and State laws need to be developed. The trade study should be national in scope and address all cacti. The results will be used to develop policy and a comprehensive trade management plan for all cacti.

4. Refine propagation techniques to provide nursery stocks and seeds to reduce collecting pressure.

The collecting pressure on natural populations could possibly be reduced by refining commercial propagation techniques. This task will be undertaken if findings of the trade management plan indicate that increased commercial propagation is an advisable means of reducing collecting pressure on natural populations.

41. Investigate various methods of propagation.

Methods of mass production of nursery-grown plants and seeds should be developed to meet field collecting demands for the bunched cory cactus.

42. Publish propagation techniques in cactus journals.

Successful propagation techniques should be compiled and published in appropriate journals.

5. Establish populations at the botanical gardens of research institutions.

Even though plants in botanical gardens can not substitute for healthy populations in natural habitats, a living collection could still contribute significantly to the overall recovery effort. Much information on ecological requirements and reproductive potential could be obtained most easily from a living collection. In addition, a permanent well documented

and accessible living collection, together with appropriate seed banking, could provide an important source of material for non-destructive research, maintenance of wild populations, and public awareness. An adequate living collection would remove the necessity of repeatedly returning to wild populations to collect plants for various recovery projects.

6. Develop public awareness, appreciation, and support for preservation of the bunched cory cactus.

Public education is a vital part of the recovery process. The cooperation of the public is essential for the ultimate success of many recovery measures.

61. Use pamphlets, talks, and slide shows to increase the public's knowledge of the bunched cory cactus.

An appreciation of the bunched cory cactus and of its role in the environment needs to be developed. This can be started with educational pamphlets, talks, and slide shows.

62. Enlist the support of public interest groups for protection and preservation of the bunched cory cactus.

Public interest groups, especially local ones such as native plant societies, Lion's Clubs, or Rotary Clubs need to be involved in recovery efforts.

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PART III

IMPLEMENTATION SCHEDULE

The following Implementation Schedule outlines actions and costs for the bunched cory cactus recovery program. It is a guide to meeting the objectives elaborated in Part II of this plan. The schedule indicates the general category for implementation, recovery plan tasks, corresponding outline numbers, task priorities, duration of tasks ("on-going denotes a task that once begun should continue on an annual basis), which agencies are responsible to perform these tasks, and lastly, estimated costs for Fish and Wildlife Service tasks. These actions, when accomplished, should bring about the recovery of the bunched cory cactus and protect its habitat. It should be noted that monetary needs for agencies other than Fish and Wildlife Service are not identified and therefore, Part III may not reflect the total financial requirements for the recovery of this cactus.

General Categories for Implementation Schedule

Information Gathering - I or R (research)

1. Population status
2. Habitat status
3. Habitat requirements
4. Management techniques
5. Taxonomic studies
6. Demographic studies
7. Propagation
8. Migration
9. Predation
10. Competition
11. Disease
12. Environmental contamination
13. Reintroduction
14. Other information

Acquisition - A

1. Lease
2. Easement
3. Management agreement
4. Exchange
5. Withdrawal
6. Fee title
7. Other

Other - 0

1. Information and education
2. Law enforcement
3. Regulations
4. Administration

Management - M

1. Propagation
2. Reintroduction
3. Habitat maintenance and manipulation
4. Predator and competitor control
5. Depredation control
6. Disease control
7. Other management

Recovery Action Priorities

1 = an action that must be taken to prevent extinction or to prevent the species from declining irreversibly in the foreseeable future.

2 = an action that must be taken to prevent a significant decline in species population/habitat quality, or some other significant negative impact short of extinction.

3 = all other actions necessary to provide for full recovery of the species.

Abbreviations Used

FWS - USDI Fish and Wildlife Service
SE - Office of Endangered Species
LE - Law Enforcement
RE - Realty
ES - Ecological Services
NPS - USDI National Park Service
TPWD - Texas Parks and Wildlife Department

PART III - IMPLEMENTATION SCHEDULE

GENERAL CATEGORY	PLAN TASK	TASK #	PRIORITY #	TASK DURATION	RESPONSIBLE AGENCY FWS REGION	FWS PROGRAM	OTHER	FISCAL YEAR COSTS (EST)* FY1	FY2	FY3	COMME
02	Enforce laws for plants on public lands	111	2	ongoing	2	SE LE	NPS TPWD	1,000	1,000	1,000	
03	Conduct Section 7 consultations	112	2	ongoing	2	ES		1,000	1,000	1,000	
M3	Develop and implement management measures for plants on public lands	113	2	2 years	2	SE	NPS TPWD	2,000	2,000		
M7	Identify protected areas on public land	114	2	2 years	2	SE	NPS TPWD	300	300		
04	Seek cooperation of land managing agencies	115	2	1 year	2	SE	NPS TPWD	250			
I6	Monitor populations on public lands	116	2	ongoing	2	SE	NPS TPWD	1,000	1,000	1,000	

PART III - IMPLEMENTATION SCHEDULE

GENERAL CATEGORY	PLAN TASK	TASK #	PRIORITY #	TASK DURATION	RESPONSIBLE AGENCY FWS REGION	RESPONSIBLE AGENCY FWS PROGRAM	RESPONSIBLE AGENCY OTHER	FISCAL YEAR COSTS (EST)* FY1	FY2	FY3	COMMF
02	Enforce laws for plants on private lands	121	2	ongoing	2	SE LE	TPWD	1,000	1,000	1,000	
03	Conduct Section 7 consultations	122	2	ongoing	2	ES		1,000	1,000	1,000	
A3	Develop cooperation with private landowners	123	2	3 years	2	SE RE		2,500	2,500	2,500	
M3	Develop and implement management plans for plants on private lands	124		2 years	2	SE		1,500	1,500		
I6	Monitor populations on private lands	125	2	ongoing	2	SE		5,000	5,000	5,000	
04	Protect plants in Mexico	13	2	3 years	2	SE		10,000	10,000	10,000	
I14	Search for new popula-tions	21	2	3 years	2	SE		6,000	6,000	6,000	

PART III - IMPLEMENTATION SCHEDULE

GENERAL CATEGORY	PLAN TASK	TASK #	PRIORITY #	TASK DURATION	RESPONSIBLE AGENCY FWS REGION	RESPONSIBLE AGENCY FWS PROGRAM	RESPONSIBLE AGENCY OTHER	FISCAL YEAR COSTS (EST)* FY1	FY2	FY3	COMMEN
R3	Study soil needs	221	3	3 years	2	SE		2,000	2,000	2,000	
R3	Study water needs	222	3	3 years	2	SE		6,000	6,000	6,000	
R8	Study seed dispersal	223	3	3 years	2	SE		5,000	5,000	5,000	
R7	Study seedling establishment	224	3	3 years	2	SE		3,000	3,000	3,000	
R14	Determine pollinators	225	3	3 years	2	SE		1,500	1,500	1,500	
R14	Determine reasons for population changes	226	2	ongoing	2	SE	NPS TPWD	5,000	5,000	5,000	
R3	Determine habitat parameters	231	2	3 years	2	SE		5,000	5,000	5,000	
04	Update management plans	232	2	ongoing	2	SE	NPS TPWD	500	500	500	

PART III - IMPLEMENTATION SCHEDULE

GENERAL CATEGORY	PLAN TASK	TASK #	PRIORITY #	TASK DURATION	RESPONSIBLE AGENCY FWS REGION	FWS PROGRAM	OTHER	FISCAL YEAR COSTS (EST)* FY1	FY2	FY3	COMMEN"
R14	Develop a trade management plan	3	2	1 year	2	SE		20,000			
R7	Investigate propagation methods	41	3	3 years	2	SE		4,000	4,000	4,000	
01	Publish techniques	42	3	1 year	2	SE		250			
M7	Establish populations at botanical gardens	5	2	2 years	2	SE		7,500	7,500		
01	Increase public awareness	61	2	ongoing	2	SE	NPS TPWD	3,000	3,000	3,000	
01	Seek support of public interest groups	62	2	ongoing	2	SE	NPS TPWD	500	500	500	

*Costs refer to USFWS expenditures only.

APPENDIX

List of Reviewers

An agency review draft of this plan was sent to the following on November 21,1986.

Desert Botanical Garden, Phoenix, Arizona

Executive Director, Texas Parks and Wildlife Department, Austin, Texas

Director, Texas Natural Heritage Program, Austin, Texas

Regional Director, National Park Service, Santa Fe, New Mexico

Regional Supervisor, Realty, USFWS, Region 2

Special Agent in Charge, Law Enforcement, USFWS, Region 2

Field Supervisor, Ecological Services, Fort Worth Field Office, USFWS, Region 2

Director (AFA/OES), Office of Endangered Species, USFWS, Washington, D.C.

Comments Received

Comment letters are reproduced in this section followed by the Service's response to each comment. Some reviewers submitted comments marked directly on the draft plan or submitted comments by phone. These comments have not been reproduced.

The public notice of review for Coryphantha ramillosa was published in the Alpine Avalanche on April 27, 1989 in accordance with the 1988 Amendments to the Endangered Species Act. This notified the public of the 30 day comment period and the availability of the draft recovery plan for public review. No comments were received.

The Federal Register Notice of Review for Coryphantha ramillosa was published on August 10, 1989 in accordance with the 1988 Amendments to the Endangered Species Act. No comments were received.

United States Department of the Interior
NATIONAL PARK SERVICE
Big Bend National Park
Rio Grande Wild and Scenic River
Big Bend National Park, Texas 79834

IN REPLY REFER TO:

N1617

December 23, 1986

Memorandum

To: Regional Director, Southwest Region
Attention: Office of Natural Resources

From: Superintendent, Big Bend National Park

Subject: Comments on Draft Recovery Plans for Neolloydia mariposensis and Coryphantha ramillosa

Our comments are as follow:

1. Draft Recovery Plan for Neolloydia mariposensis:

   A. Page 14, #2: Add "on private land." To set up an area to specifically manage for a single species in the park could prove detrimental to the species and would tend to further complicate in-park policies. We are currently working with two threatened plants, two endangered animals and at least three soon to be listed as threatened.

   B. Page 15, #112: This step implies a specific management plan to be developed for this species within the park. It would appear that a single overall plan would be more efficient and that private lands should receive higher priority than public lands.

   C. Page 17-21: 11 and 12 should be combined.

   D. Page 18, #113: It may not be desirable to delineate specific areas within a national park to be managed for a specific species.

   E. Page 19, $114: No memorandum of understanding or cooperative agreement is needed on a species by species basis.

   F. Page 24, #23: This should probably be placed earlier in the hierarchy than 21 or 22.

   G. Page 26, #5: Where and who has current living specimens. This should be ascertained prior to collecting more specimens from the field.

H. Part III, Implementation Schedule: Most of the estimated costs appear quite low.

2. Draft Recovery Plan for Corvphantha ramillosa:

A. Page 14, #2: Add "on private land" (see comment A on preceeding page). A-l

B. Page 14-15: Combine 11 and 12 (see comment B on preceeding page). A-2

C. Page 16-20: Combine 11 and 12.

D. Page 17-18: There is no #113. A-3

E. Page 17, #112: Not necessarily desirable to delineate areas of specific management for individual species. A-4

F. Page 18, #114: See comment E on preceeding page. A-5

G. Page 23, #23: See comment F on preceeding page. A-6

H. Page 25, #5: See comment G on preceeding page. A-7

I. Part III, Implementation Schedule: See comment H on preceeding page. A-8

We appreciate the opportunity to comment on the Draft Recovery Plan.

James W. Carrico

TEXAS NATURAL' HERITAGE PROGRAM
GENERAL LAND OFFICE
STEPHEN F. AUSTIN BUILDING
1700 NORTH CONGRESS AVENUE
ROOM 619
AUSTIN, TEXAS 78701
(512) 463-5299
1-800-252-RARE

January 6, 1987

Dr. Charlie McDonald
U.S. Fish and Wildlife Service
Endangered Species Office
P.O. Box 1306
Albuquerque, New Mexico 87103

Dear Charlie,

Thank you for allowing me the opportunity to comment on the recovery plan for Bunched Cory Cactus (Coryphantha ramillosa).

The morphology section should be modified as follows to conform with Dr. Allan Zimmerman's description of the species, as he is the authority on the' genus. The stems are dark grayish green, solitary or rarely with a few branches, 6-9 cm (2.4-3.6 in.) long, and 6-9.5 cm (2.4-3.7 in.) in diameter. There are 3-6 central spines: 1 inner, and 2-5 'outer, usually 3. The inner central spine is 25-40 mm (l-l.6 in.) long, and the outer central spines, 17-38.5 mm (.7-1.5 in) long. The dull white to pale gray radial spines are 12-30 mm (.5-1.2 in.) long. The flowers are 38-65 mm (1.5-2.6 in.) long and 30-50 mm (1.2-2 in.) in diameter. The fruits are 1-2.5 mm (.4-1 in.) long. The seeds are finely raised-reticulate, reniform, reddish-brown, and 1.4-1.5 mm (.06 'in.) long. B-1

In the section on impacts and threats, it is stated that "most collectors would have to trespass... getting through gates and across posted property." While the trespassing aspect is true, one of the major sites is along a former country road without gates. Also many sites could be accessed from the Rio Grande, where there are no gates nor posted signs. B-2

The State law will help, to some extent, protect the bunched cory cactus from collecting on private land, although this is not stated in the narrative. The State law requires collection permits for commercial collecting from private land.

Sincerely,

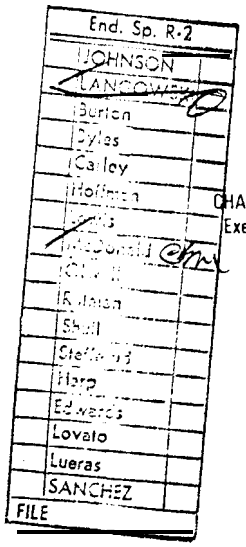
Jackie

Jackie M. Poole
Botanist, Texas Natural Heritage Program

JMP:mt

TEXAS
PARKS AND WILDLIFE DEPARTMENT
4200 Smith School Road Austin, Texas 78744

CHARLES O. TRAVIS
Executive Director



February 5, 1987

Dr. Charles McDonald
U.S. Fish & Wildlife Service
Endangered Species Office
P.O. Box 1306
Albuquerque, New Mexico 87103

RE: Region 2: SE
Draft Recovery Plan for Bunched Cory Cactus

Dear Dr. McDonald:

The U.S. Fish & Wildlife Service draft recovery plan for bunched cory cactus (Coryphantha ramillosa) has been reviewed by Texas Parks & Wildlife Department staff. Department staff concurs with and supports the comments submitted by Jackie M. Poole of the Texas Natural Heritage Program.

In the Impacts and Threats section, "trespass on private land" is mentioned as the major means of access to populations of the plant. One of the major sites for the bunched cory cactus is located along a former country road which is not gated. Other sites could be accessed without restriction from the Rio Grande River. C-1

The fourth paragraph of the Collecting and Trade subsection should distinguish between scientific and commercial collecting permits. The second sentence should read, "Under Texas law, a scientific collecting permit . . ." The third sentence should end with ". . . and a commercial collecting permit." Texas law requires a commercial collecting permit in order to collect for commercial purposes from private land. This permit is required in addition to the plant tags already mentioned in the plan. The tags may not be removed until the plant has been transplanted to its ultimate site for landscaping or other purposes. Only the ultimate owner or a department employee may remove the tag. The end of the last sentence should be modified to read ". . . its ultimate destination." Page 19, number 121 should also reflect the commercial collecting permit required by Texas law. C-2

Thank you for the opportunity to comment on this draft recovery plan.

Sincerely,

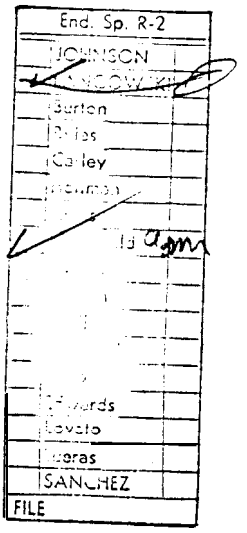
Charles D. Travis
Executive Director

CDT/DLR/dr

United States Department of the Interior

FISH AND WILDLIFE SERVICE
WASHINGTON, D.C. 20240

ADDRESS ONLY THE DIRECTOR.
FISH AND WILDLIFE SERVICE



In Reply Refer To:
FWS/OES

MAY - 3 1987

Memorandum

To: Regional Director, Region 2

From: Assistant Director - Fish and Wildlife Enhancement

Subject: Review of Six Texas Draft Plant Recovery Plans

We have reviewed the technical/agency drafts of the Texas snowbells, slender rush-pea, ashy dogweed, Johnston's frankenia, Lloyd's Mariposa cactus, and bunched cory cactus recovery plans. Editorial comments for each of the plans are provided as marginalia on the attached plans. In addition, the following comments are provided:

1. Some of these plans give detailed site locations, e.g., ashy dogweed and slender rush-pea. On page 10 of the ashy dogweed, it states that ". ..publication of its one location could lead to vandalism or imprudent taking." However, on page 8 of the same plan, it gives details on land ownership plus additional information that a gas pipeline crosses the site. With this degree of detail, it would be relatively easy to locate the subject plants. Please consider if you wish to be this specific. D-1

2. The Implementation Schedule of some of the plans have tasks which are assigned Priorities of 1. A Priority 1 task is an action that must be taken to prevent extinction or to prevent the species from declining irreversibly in the foreseeable future (emphasis added). Some of the Priority 1 tasks are questionable. For example, Lloyd's Mariposa cactus is a threatened species found on National Park Service land and on private land. Much of the private land is owned by the Lafitas Museum and Desert Garden. It seems inappropriate to have task 122, "Establish safe sites on private lands" and task 123, "Develop and implement species management plans" as Priority 1 tasks. Also, note that tasks 111-115 are missing from the Implementation Schedule for this plan. D-2

   Similar concerns exist for the Priority 1 tasks listed for the threatened bunched cory cactus. This cactus is also found on National Park land, State land, and private land. It seems inappropriate to have tasks 112 and 113 dealing with protection on private lands assigned a level 1 priority.

SE

3. The recovery objectives for the threatened bunched cory cactus and Lloyd's Mariposa cactus have interim goals of 10,000 individuals and 20,000 individuals, respectively. Why is the interim goal for the Lloyd's cactus double that of the bunched cory cactus? D-3

4. All maps and drawings should include a scale to better depict size and distance. D-4

5. Most of the plans do not quantify the primary objective. This should be done if at all possible. D-5

I hope these comments are useful as you prepare the final draft of these recovery plans for the Regional Director's approval. Upon his approval, notify the Office of Endangered Species, 500 Broyhill Building, and provide them with 30 copies of the printed plan when it is available.

Ronald E. Lambertson

Attachments

OPTIONAL FORM NO. 10
MAY 1962 EDITION
GSA FPMR (41 CFR) 101-11.6

UNITED STATES GOVERNMENT

Memorandum

U.S. FISH & WILDLIFE SERVICE
Region 2, Albuquerque, New Mexico 87103

TO : Assistant Regional Director, Region 2 (AFF)

DATE: January 15, 1987
LA-Texas

FROM : Acting Regional Supervisor, Division of Realty

SUBJECT: Agency Review Draft on Two Recovery Plans

As requested in your November 18, 1986, memorandum, we have reviewed the agency review draft recovery plans for the Lloyd's mariposa cactus and the bunched cory cactus.

Roth plans discuss the establishment of safe sites on private lands as one of the recovery objectives. Realty suggests that the sentence:

> Protective action by the Service would. require full NEPA compliance and documentation.

be changed to read:

> Protective actions by the Service may involve easement or fee-acquisition of lands and would require full NEPA compliance and documentation. E-1

Thank you for the opportunity to review these plans, and please contact Bruce Halstead if you have any questions or require additional information.

Larry A. Dunkeson (signature)

Larry A. Dunkeson

Charles, I discussed this with Larry & explained that we cannot make the change as he requested. Paul

End. Sp. R-2
JOHNSON
LANGOWSKI
Burton
Byles
Carley
Hollman
FILE

FWS REG 2
RECEIVED
JAN 20 '87
SE

Response to Comments

A-1 The second (it has been moved to the first position in the final plan) required action for delisting the bunched cory cactus has been modified to read, "Identify at least three sites where the species will be protected." This type of identification should not restrict park activities or complicate in-park policies to any greater extent than is necessary to protect the species.

A-2 The tasks, 11 "Protect populations on public lands," and 12, "Protect populations on private lands," have not been combined because, although the overall goals for both tasks are the same, the needed steps and responsible agencies are slightly different. The task to develop specific management plans for the species has been modified and now reads, "Specific management measures should be included in appropriate agency planning documents." It is felt that having each land managing agency develop their own management measures is preferable to having a single all-encompasing management plan.

A-3 This error has been corrected.

A-4 See response A-1. Also, the task, "Establish safe sites," has been changed to read, "Identify areas for protection." Areas identified for protection do not have to be designated as areas managed specifically for the bunched cory cactus, but any land use conflicts must be resolved in ways that assure the species' continued existence.

A-5 Memoranda of understanding and cooperative agreements are standard documents for formalizing interagency cooperation. Although the National Park Service may not feel that species by species agreements are presently needed, the task is being retained because circumstances could make such agreements useful in the future.

A-6 The numerical sequence of the recovery tasks does not necessarily represent the order in which the tasks will be accomplished. Never-the-less, it does seem sensible to have searches for additional populations come earlier in the outline than biological and ecological studies, so this change in outline order has been made.

A-? When botanical garden populations are established, care will be taken to insure that previous efforts are not being duplicated.

A-8 Costs in the implementation schedule have been reviewed and some costs have been revised upward.

B-1 This morphological description has been included in the plan.

B-2 The Impacts and Threats section has been revised to incorporate these comments.

B-3 This information has been added to the Narrative section of the plan.

C-1 The Impacts and Threats section has been revised to incorporate these comments.

c-2 These changes have been made.

D-1 The distribution information has been reviewed and it appears to be sufficiently general that it will not cause any additional risk to the species.

D-2 Priorities have been reviewed and several tasks formerly given Priority 1 have been reassigned to Priority 2.

D-3 The different figures reflect different estimates of present plant abundance. In addition, Lloyd's Mariposa cactus occurs in areas more vulnerable to collecting than does bunched cory cactus and it, therefore, may need a larger number of plants to insure its safety.

D-4 A scale has been added to the distribution map.

D-5 This plan has a quantified primary objective.

E-1 This task has been revised with a new goal of developing cooperation with private landowners. The extent that this cooperation is formalized through written agreements and the level of involvement by Fish and Wildlife, Realty Division cannot be specified at this time.